



SSP: Surface Salinity Profiler

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Objectives

- Investigate near-surface salinity gradients via in situ measurements
- Characterize their spatial distribution – $O(10 \text{ km})$
- Determine specific environmental conditions under which they form
- Examine their persistence over time once they have formed





Approach

- Continuous TSG (2 m & 3 m) on R/V Thompson
- Process study cruises to measure near-surface profile (0.1 to 5 m) with towed Surface Salinity Profiler (SSP)
 - Kilo Moana, Samoa to Hawaii, Nov 2011
 - SPURS, 2012
- Compare with General Ocean Turbulence Model

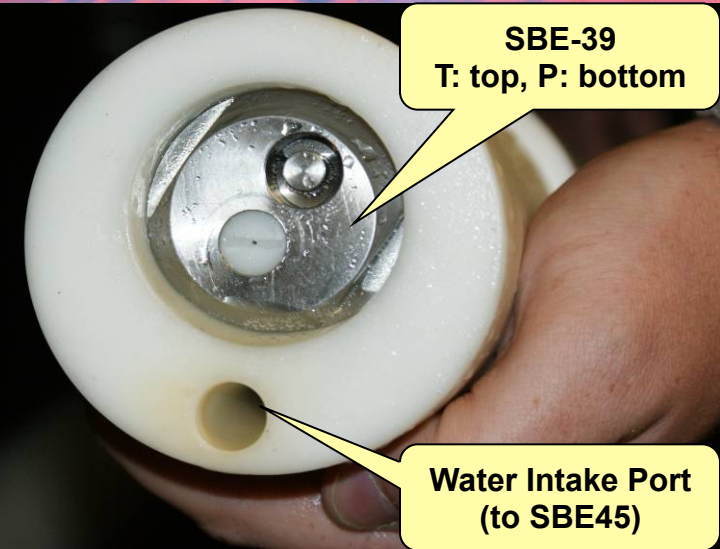


Status

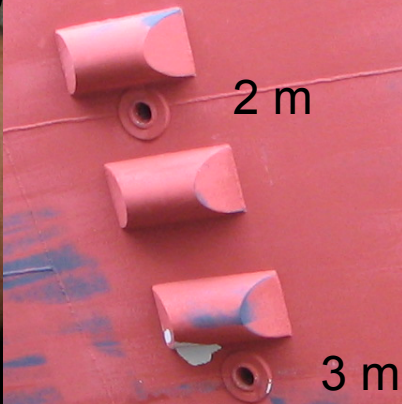
- Underway system installed on Thompson
 - Preliminary measurements Fall 2010
 - Intriguing examples: diurnal warming, rain
 - Issue of TSG drift / agreement
 - Redeployment April 2011
- SSP constructed and tested in Puget Sound
 - Deployed on R/V Thompson
 - Brief comparison of thru-hull and towed data

Through-the-hull Underway System

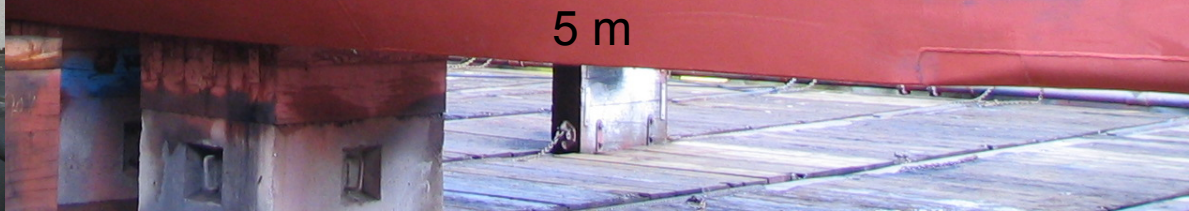
UW R/V Thompson



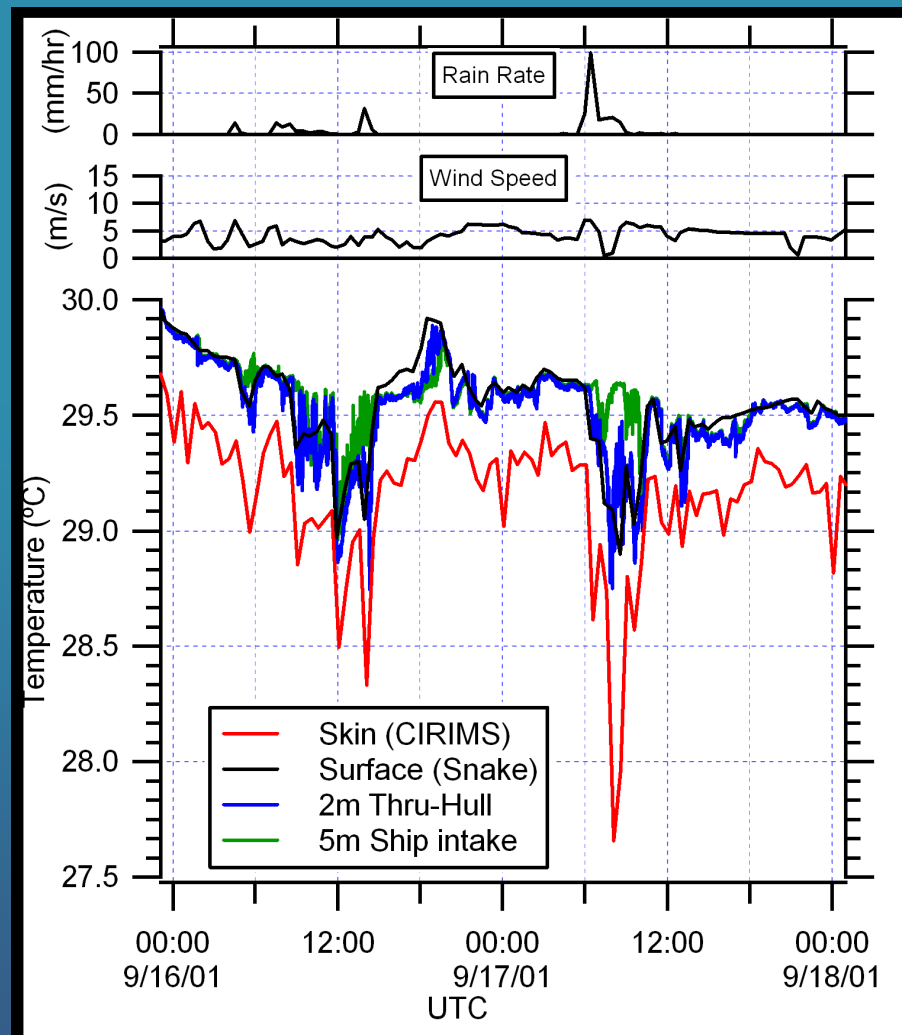
SBE 45 microTSG



Bow Thruster

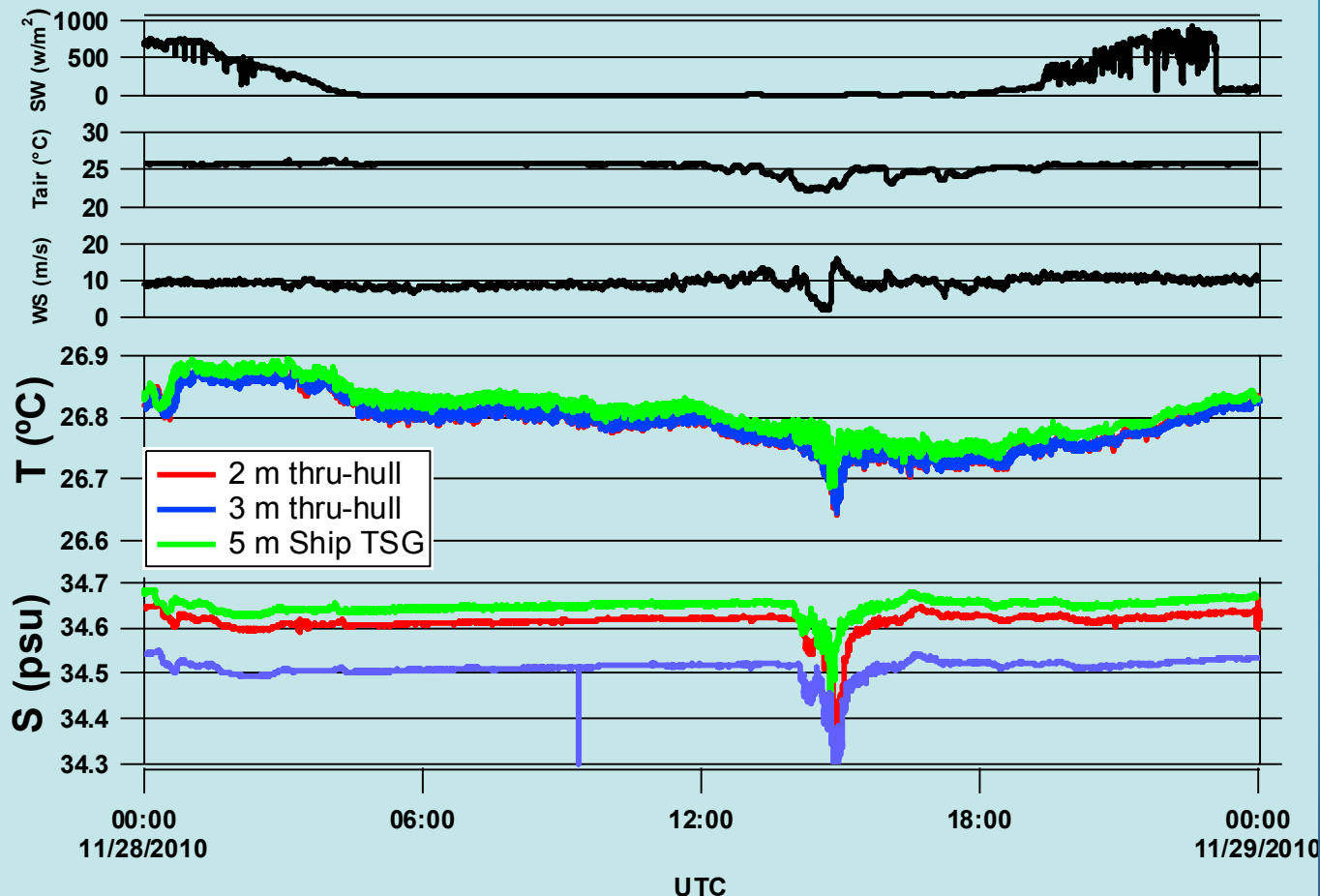


SST Rain Event Signature (EPIC 2001 R/V Brown)



Rain Event / Calibration Issue

R/V Thompson 2010



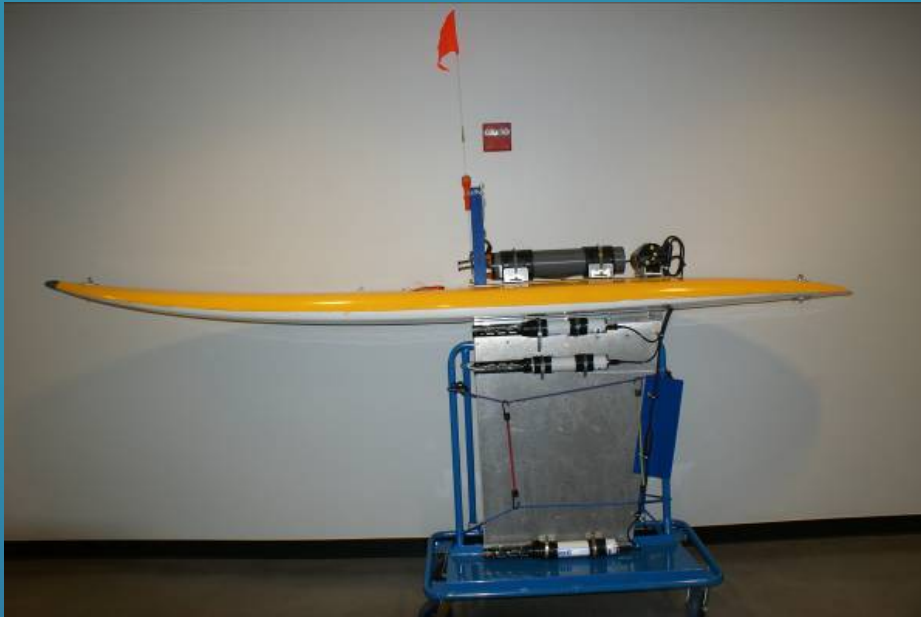
T offset
Hull: SBE39s agree
Ship: SBE21 offset

S offset
Hull: SBE45s drifted
Ship: SBE21 offset

SBE Accuracy & Drift

Sensor	Model	Measure	Accuracy	Drift / mo	1y drift
SSP	45	Cond, S/m	0.0003	0.0003	0.0036
		Temp, C	0.002	0.0002	0.0024
		Salinity, psj	0.005	0.003	0.036
2 & 3 m	49	Cond, S/m	0.0003	0.0003	(0.0036)
		Temp, C	0.002	0.0002	(0.0024)
		Salinity, psj	(0.005)	(0.003)	(0.036)
Ship TSG (5 m)	21	Cond, S/m	0.001		
		Temp, C	0.01		
		Salinity, psj			O(0.1)?

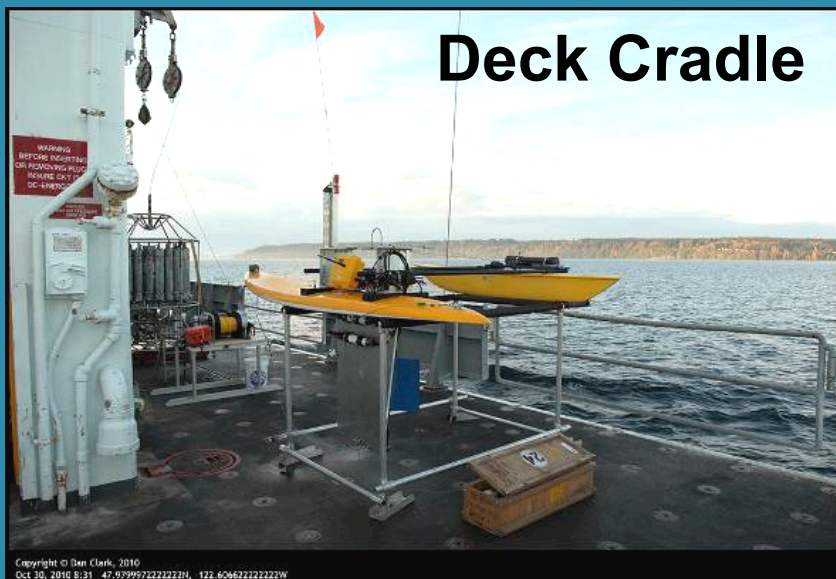
SSP: Sea Surface Profiler



- SBE 49 FastCAT CTD: 5 cm, 20 cm, 1 m
- Battery operated, internal recording & telemetry
- 3-pt bridle and “kicker” fin to tow outside wake

SSP Deployment

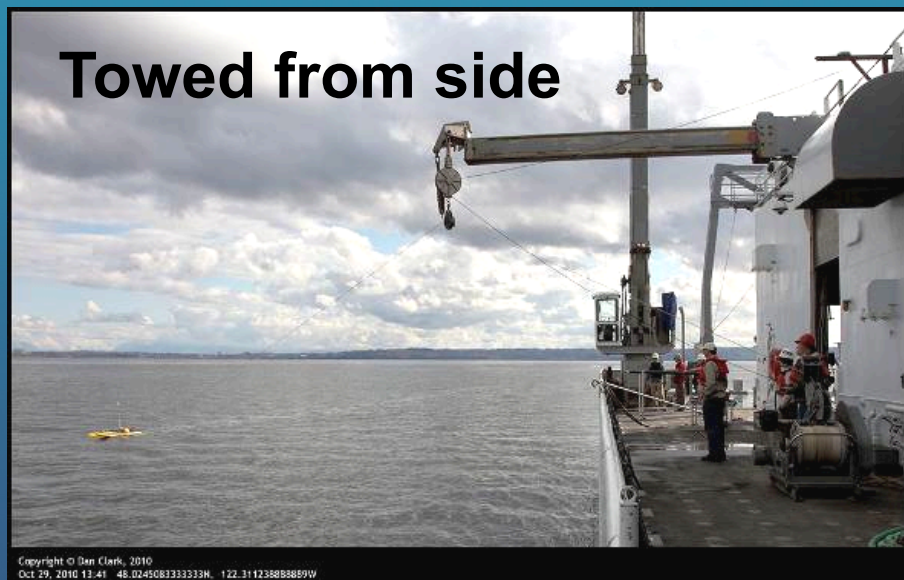
Deck Cradle



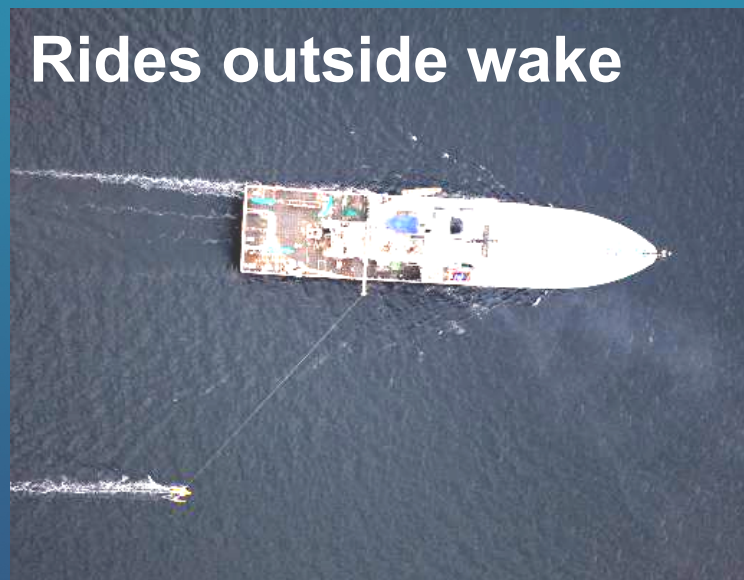
Crane deployed



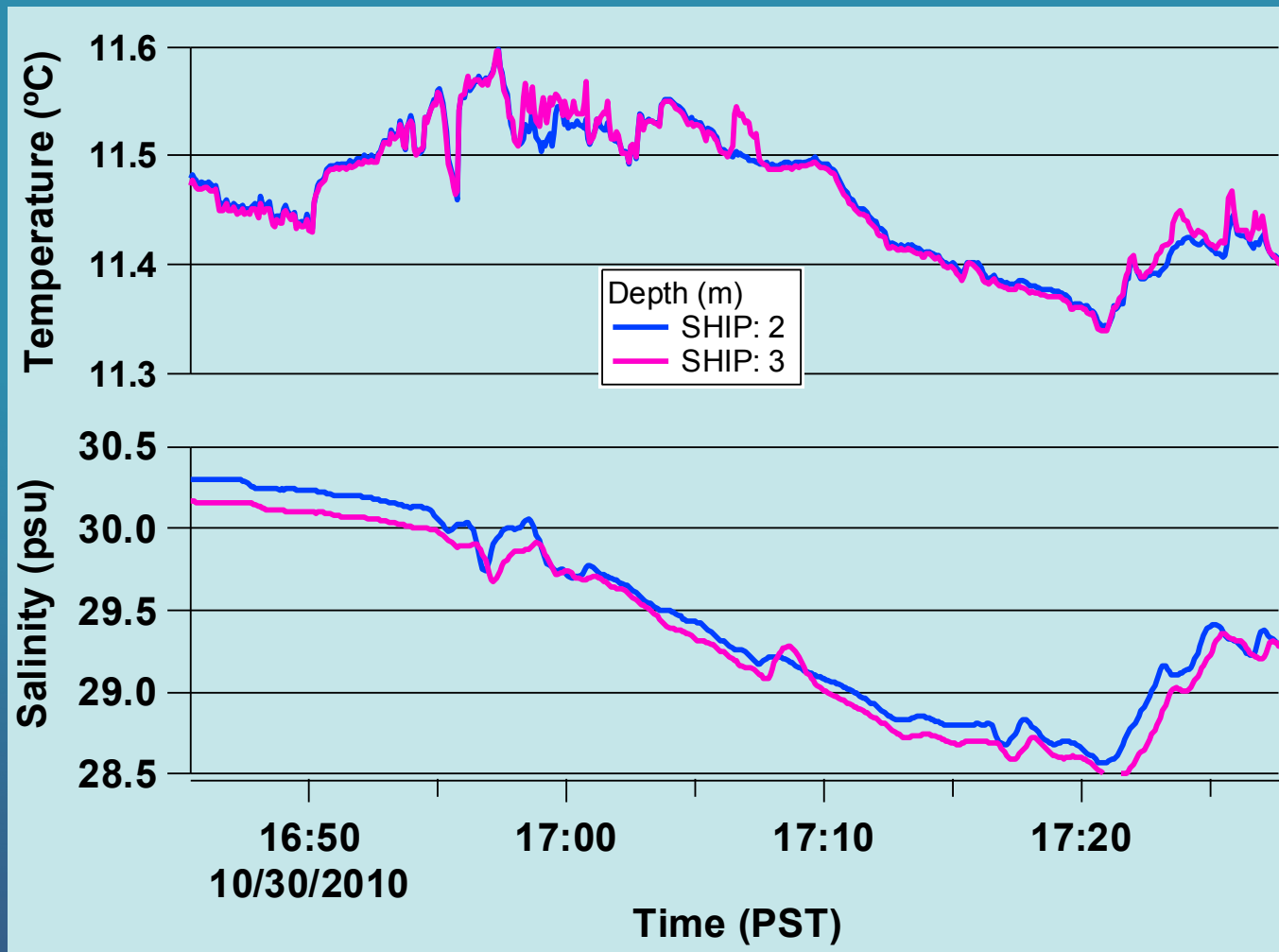
Towed from side



Rides outside wake

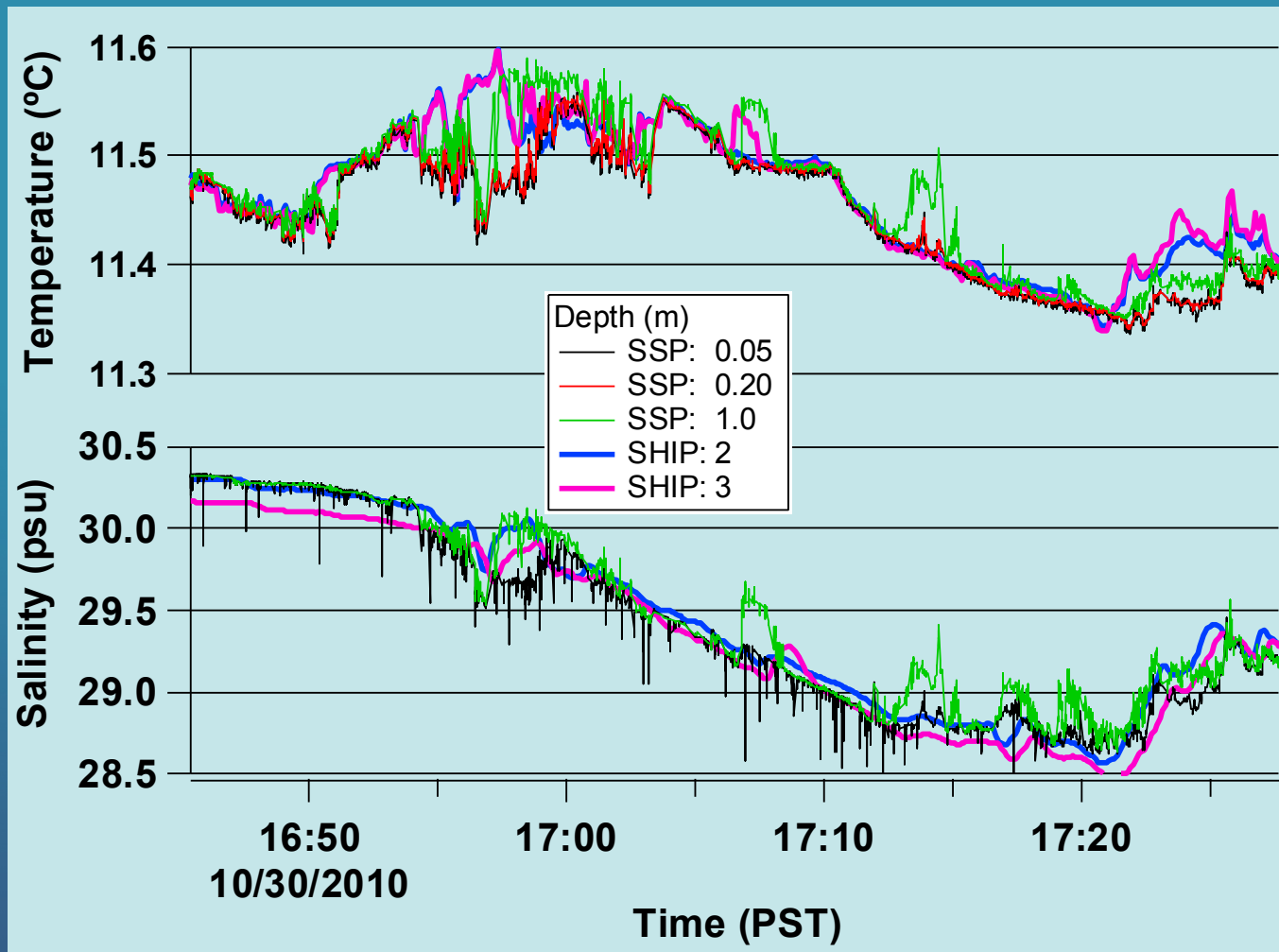


Thompson Puget Sound: Ship



0.1 psu offset

Thompson Puget Sound: Ship & SSP



0.1 psu offset

SSP agrees w/
Ship 2 m

0.05 cm spiky

Bubbles at 0.05 m Sensor



4 kts



6 kts



SPURS Ship Needs

- Intermediate ship ok
- 1 person w/ help and can help others
- Underway measurements
 - 10-14 days
 - 4-6 hrs/dy @4-5 kts
 - Good w/ daily auto. profilers, eg, ASIP
 - Low wind, high sun and/or rain